Executive Summary

The Guyandotte River watershed, located in southwestern West Virginia, is part of the Ohio River basin. The heavily forested area drained by the Guyandotte River is approximately 1,680 square miles and lies within portions of the following counties: Raleigh, Wyoming, Logan, Mingo, Boone, Lincoln, Putnam, and Cabell. The largest tributaries of the Guyandotte River are Mud River, Clear Fork, and Island Creek. A large portion of the Guyandotte River basin lies in the southern coalfields of West Virginia, where extensive coal deposits are the most economically valuable mineral resource in the area. Forestry is another major industry in the Guyandotte watershed.

West Virginia's 1996, 1998, and 2002 Section 303(d) lists include 123 waterbodies in the Guyandotte River watershed because of fecal coliform bacteria, metals (total aluminum, iron, manganese, and selenium), pH, and/or biological impairments. Total Maximum Daily Loads (TMDLs) were developed for the 66 segments in the Guyandotte River watershed that are impaired relative to total iron, manganese and selenium, dissolved aluminum, pH, fecal coliform bacteria and/or biological impairments. TMDLs for the remaining 57 segments listed for biological impairment only will be established within 8-13 years of their initial listing.

Requirements Governing West Virginia Water Quality Standards, West Virginia Code of State Rules, Title 46, Series 1 defines total iron and pH numeric criteria under the Aquatic Life and the Human Health use designation categories. Total manganese and fecal coliform bacteria have numeric criteria under the Human Health designation category. Recently, EPA approved revisions to certain water quality standards in West Virginia including an aquatic life protection change to aluminum criteria from total recoverable to dissolved. The listed waterbodies in the Guyandotte River watershed have been designated as having an Aquatic Life and a Human Health use.

The Guyandotte River watershed was divided into 14 regions representing hydrologic units. Each region was further divided into subwatersheds for modeling purposes; a total of 369 for the entire watershed. The 14 regions and their respective subwatersheds provided a basis for georeferencing pertinent source information and monitoring data, and for presenting TMDLs. The Mining Data Analysis System (MDAS) was used to represent the source-response linkage in the Guyandotte River watershed for total aluminum, manganese, iron and fecal coliform bacteria. The MDAS is a comprehensive data management and modeling system that is capable of representing loads from nonpoint and point sources found in the watershed and simulating in-stream processes. MDAS was linked with the Dynamic Equilibrium In-stream Chemical Reactions model (DESC) to appropriately address dissolved aluminum TMDLs in the watershed. Based on a pollutant flow analysis, a low flow critical condition was identified and using modeled flow from MDAS the low flow 7Q10 was determined to be 0 cfs. The MINTEQ modeling system was used to represent the source-response linkage in the Guyandotte River watershed for pH.

Primary sources contributing to metals and pH impairments include an array of nonpoint or diffuse sources as well as discrete point sources/permitted discharges. Most of the point sources with metals permits in the watershed are mining-related. The unpermitted and nonpoint sources

include abandoned mines (AMLs), revoked permits, burned forest, harvested forest, oil and gas operations and roads.

The unpermitted and nonpoint fecal coliform sources within the Guyandotte River watershed include urban and residential runoff, leaking sanitary sewers, failing septic systems and straight pipe discharges, grazing livestock, runoff from cropland, and wildlife.

West Virginia's numeric water quality criteria and an explicit margin of safety (MOS) were used to identify endpoints for TMDL development.

The following general methodology was used when allocating to sources of metals for the Guyandotte River watershed TMDLs.

- For watersheds with AMLs but no permitted point sources, AMLs were reduced first, until in-stream water quality criteria were met or to conditions no less than those of undisturbed forest. If further reductions were required, then the sediment sources (Harvested Forest, Burned Forest, Oil and Gas operations, and Roads) were reduced until water quality criteria were met.

- For watersheds with AMLs and point sources, point sources were set at the precipitation induced load defined by the permit limits and AMLs were subsequently reduced. AMLs and revoked mining permits were reduced (point sources were not reduced) until in-stream water quality criteria were met, if possible. If further reduction was required once AMLs and revoked mines were reduced, sediment sources were then reduced. If even further reduction was required, the point source discharge limits were then reduced.

- For watersheds where dissolved aluminum TMDLs were developed, source allocations for total iron and manganese were developed first since their total in-stream concentrations (primarily iron) significantly reduce pH and consequently are associated with increased dissolved aluminum concentrations. If the dissolved aluminum TMDL endpoint was not attained after source reductions to iron and manganese, the total aluminum sources were reduced based on the methodology described above.

- Since the primary sources contributing to selenium impairments are the point sources at a low flow 7Q10 condition of 0 cfs, the nonpoint source contributions of selenium were considered to be negligible. Therefore, the TMDLs were based on wasteload allocations assigned at water quality criteria for selenium (5 ug/L) at the end of pipe for the surface mining discharging upstream of the 7Q10 condition of 0cfs (Upton Branch).

The following general methodology was used when allocating to sources for the Guyandotte River fecal coliform bacteria TMDL:

- All point sources in the Guyandotte River watershed were set at permit limits (200 counts/100mL monthly average) and all illicit, non-disinfected discharges of human waste (i.e., straight pipes and failing septic systems) were eliminated. If further reduction was necessary, source loadings from residential areas and agricultural lands were subsequently reduced until in-stream water quality criteria were met.

Tables 1, 2, and 3 show the baseline and allocated loads, along with the margin of safety (MOS) and percent reduction impaired segment. Figure 1 shows the Guyandotte River watershed and its 14 regions.

Table 1. Aluminum Baseline and Allocated Loads by Impaired Segment

Parameter	DNRCODE	DNRN	Region	Baseline LA	LA	Baseline WLA	WLA	MOS	TMDL	% Red.
Aluminum	OG-100	Clear Fork (OGC)	11	460,464	121,115	66,410	59,338	9,498	189,951	66
Aluminum	OG-134	Slab Fork	14	18,936	10,598	2,543	2,543	692	13,833	39
Aluminum	OG-138	Winding Gulf	14	160,013	31,576	14,270	14,270	2,413	48,259	74
Aluminum	OG-49	Big Creek	5	27,641	13,793	1,026	1,026	780	15,599	48
Aluminum	OG-51	Crawley Creek	1	4,348	4,348	0	0	229	4,577	0
Aluminum	OG-61	Buffalo Creek	1	18,040	4,006	0	0	211	4,217	78
Aluminum	OG-65	Island Creek	6	950,883	82,883	109,637	109,637	10,133	202,652	82
Aluminum	OG-65-B	Copperas Mine Fork	6	103,302	17,750	59,827	59,827	4,083	81,660	52
Aluminum	OG-75	Buffalo Creek	8	50,985	12,409	80,003	60,806	3,853	77,068	44
Aluminum	OG-89	Gilbert Creek	7	27,811	7,855	29,029	27,912	1,882	37,649	37
Aluminum	OG-96	Big Cub Creek	7	27,050	6,278	10,780	10,780	898	17,956	55

Table 2. Iron Baseline and Allocated Loads by Impaired Segment

Parameter	DNRCODE	DNRN	Region	Baseline LA	LA	Baseline WLA	WLA	MOS	TMDL	% Red.
Iron	O-4	Guyandotte River	1	760,790	421,132	710,685	515,830	49,314	986,276	36
Iron	OG-100	Clear Fork (OGC)	11	96,785	44,298	66,783	58,120	5,390	107,808	37
Iron	OG-108	Little Cub Creek/Upper Guyandotte River	7	2,185	763	0	0	40	804	65
Iron	OG-10-A	Right Fork/Merritt Creek	1	272	272	0	0	14	286	0
Iron	OG-110	Indian Creek	12	7,812	6,703	40,586	28,130	1,833	36,666	28
Iron	OG-110-A	Brier Creek/Indian Creek	12	394	394	153	153	29	575	0
Iron	OG-110-A-2	Marsh Fork/Brier Creek	12	70	70	109	109	9	189	0
Iron	OG-124	Pinnacle Creek	13	25,744	8,827	50,291	43,092	2,733	54,651	32
Iron	OG-124-D	Smith Branch/Pinnacle Creek	13	497	497	240	240	39	775	0
Iron	OG-124-H	Laurel Branch/Pinnacle Creek	13	55	55	809	606	35	696	23
Iron	OG-124-I	Spider Creek	13	285	285	34	34	17	336	0
Iron	OG-127	Cabin Creek	7	861	861	331	331	63	1,255	0
Iron	OG-128	Joe Branch	7	2,787	483	791	791	67	1,341	64
Iron	OG-129	Long Branch	7	1,539	317	1,606	1,606	101	2,024	39
Iron	OG-130	Still Run	7	4,711	1,820	1,136	1,136	156	3,111	49
Iron	OG-131	Barkers Creek	14	17,532	11,597	5,840	5,840	918	18,355	25
Iron	OG-131-B	Hickory Branch/Barkers Creek	14	351	351	0	0	18	370	0
Iron	OG-131-F	Gooney Otter Creek	14	8,785	3,341	4,559	4,559	416	8,316	41
Iron	OG-131-F-1	Jims Branch/Gooney Otter Creek	14	389	160	0	0	8	169	59
Iron	OG-131-F-2	Noesman Branch	14	1,301	530	573	573	58	1,161	41
Iron	OG-134	Slab Fork	14	10,630	8,317	2,489	2,489	569	11,374	18
Iron	OG-134-D	Measle Fork	14	124	124	0	0	7	130	0
Iron	OG-135-A	Left Fort/Allen Creek	14	2,652	564	0	0	30	594	79

Parameter	DNRCODE	DNRN	Region	Baseline LA	LA	Baseline WLA	WLA	MOS	TMDL	% Red.
Iron	OG-137	Devils Fork	14	4,519	4,519	0	0	238	4,757	0
Iron	OG-138	Winding Gulf	14	46,604	16,604	13,966	13,966	1,609	32,179	50
Iron	OG-139	Stonecoal Creek	14	14,328	5,279	3,460	3,460	460	9,199	51
Iron	OG-48	Limestone Branch	1	294	268	0	0	14	282	9
Iron	OG-49-A	Ed Stone Branch/Big Creek	5	73	73	0	0	4	77	0
Iron	OG-49-A-1	North Branch/ Ed Stone Branch	5	26	26	0	0	1	28	0
Iron	OG-53	Godby Branch	1	56	56	0	0	3	59	0
Iron	OG-61	Buffalo Creek	1	3,149	847	0	0	45	892	73
Iron	OG-65-A	Coal Branch/Island Creek	6	960	366	0	0	19	386	62
Iron	OG-65-B	Copperas Mine Fork	6	30,340	13,410	58,552	41,575	2,894	57,879	38
Iron	OG-65-B-1	Mud Fork	6	13,107	6,131	0	0	323	6,454	53
Iron	OG-65-B-1-A	Lower Dempsey Branch	6	1,434	516	0	0	27	544	64
Iron	OG-65-B-1-B	Ellis Branch/Mud Fork	6	2,049	829	0	0	44	872	60
Iron	OG-65-B-1-E	Upper Dempsey Branch	6	435	166	0	0	9	175	62
Iron	OG-65-B-4	Trace Fork/Copperas Mine Fork	6	6,679	1,030	13,877	8,326	492	9,848	54
Iron	OG-75-C.5	Proctor Hollow/Buffalo Creek	8	956	341	3,127	1,626	104	2,070	52
Iron	OG-76	Huff Creek	9	22,634	14,366	36,286	25,815	2,115	42,296	32
Iron	OG-76-L	Toney Fork/Huff Creek	9	3,319	1,068	6,083	3,954	264	5,286	47
Iron	OG-77-A.5	Oldhouse Branch/Rockhouse Creek	7	396	137	47	47	10	194	58
Iron	OG-92-I	Muzzle Creek	10	1,750	1,343	0	0	71	1,414	23
Iron	OG-92-K	Buffalo Creek/Little Huff Creek	10	1,338	534	112	112	34	680	55
Iron	OG-92-K-1	Kezee Fork	10	65	65	0	0	3	69	0
Iron	OG-92-K-2	Mudlick Fork/Buffalo Creek	10	16	16	0	0	1	16	0
Iron	OG-92-Q	Pad Fork	10	4,310	1,497	506	506	105	2,109	58
Iron	OG-92-Q-1	Righthand Fork/Pad Fork	10	872	383	380	380	40	804	39
Iron	OG-96-A	Sturgeon Branch	7	34	34	0	0	2	36	0
Iron	OG-96-B	Road Branch	7	1,571	948	2,928	2,196	166	3,310	30
Iron	OG-96-C	Elk Trace Branch/Big Cub Creek	7	1,793	402	0	0	21	424	78
Iron	OG-96-F	Toler Hollow	7	305	145	443	310	24	480	39
Iron	OG-96-H	McDonald Fork	7	836	293	2,595	1,817	111	2,221	39
Iron	OG-99	Reedy Branch	7	2,153	2,153	4,211	2,948	268	5,369	20
Iron	OGC-12	Lower Road Branch	11	1,995	732	3,753	2,064	147	2,944	51
Iron	OGC-16	Laurel Fork	11	52,779	25,096	23,899	20,476	2,399	47,971	41
Iron	OGC-16-M	Milam Branch	11	2,076	1,706	0	0	90	1,796	18
Iron	OGC-16-P	Trough Fork	11	4,624	2,916	3,699	3,560	341	6,817	22
Iron	OGC-19	Toney Fork/Clear Fork	11	3,013	2,169	4,062	4,062	328	6,560	12
Iron	OGC-26	Crane Fork	11	8,033	1,678	2,779	2,779	235	4,692	59

Table 3. Manganese Baseline and Allocated Loads by Impaired Segment

Parameter	DNR Code	DNR Name	Region	Baseline LA	LA	Baseline WLA	WLA	MOS	TMDL	% Red.
Manganese	OG-108	Little Cub Creek/Upper Guyandotte River	7	3,130	3,130	0	0	165	3,294	0

Parameter	DNR Code	DNR Name	Region	Baseline LA	LA	Baseline WLA	WLA	MOS	TMDL	% Red.
Manganese	OG-110	Indian Creek	12	30,722	24,590	16,341	14,338	2,049	40,978	17
Manganese	OG-110-A	Brier Creek/Indian Creek	12	5,129	4,516	93	93	243	4,852	12
Manganese	OG-110-A-2	Marsh Fork/Brier Creek	12	1,744	1,509	67	67	83	1,658	13
Manganese	OG-124	Pinnacle Creek	13	100,870	39,944	20,961	20,961	3,206	64,110	50
Manganese	OG-124-D	Smith Branch/Pinnacle Creek	13	3,918	1,470	127	127	84	1,680	61
Manganese	OG-124-H	Laurel Branch/Pinnacle Creek	13	381	381	334	334	38	753	0
Manganese	OG-124-I	Spider Creek	13	7,365	5,691	18	18	300	6,009	23
Manganese	OG-127	Cabin Creek	7	4,636	4,636	202	202	255	5,093	0
Manganese	OG-128	Joe Branch	7	15,779	1,749	451	451	116	2,316	86
Manganese	OG-129	Long Branch	7	8,414	808	892	892	89	1,789	82
Manganese	OG-130	Still Run	7	28,861	12,187	691	691	678	13,556	56
Manganese	OG-131	Barkers Creek	14	63,506	45,677	3,271	3,271	2,576	51,524	27
Manganese	OG-131-B	Hickory Branch/Barkers Creek	14	2,627	1,379	0	0	73	1,452	47
Manganese	OG-131-F	Gooney Otter Creek	14	39,513	22,932	2,531	2,531	1,340	26,803	39
Manganese	OG-131-F-1	Jims Branch/Gooney Otter Creek	14	1,962	1,061	0	0	56	1,117	46
Manganese	OG-131-F-2	Noesman Branch	14	6,652	3,548	345	345	205	4,098	44
Manganese	OG-134	Slab Fork	14	56,987	38,163	1,482	1,482	2,087	41,732	32
Manganese	OG-134-D	Measle Fork	14	3,831	2,473	0	0	130	2,603	35
Manganese	OG-135-A	Left Fort/Allen Creek	14	11,751	3,538	0	0	186	3,725	70
Manganese	OG-137	Devils Fork	14	119,838	31,407	0	0	1,653	33,060	74
Manganese	OG-138	Winding Gulf	14	124,932	80,793	6,919	6,919	4,616	92,329	33
Manganese	OG-139	Stonecoal Creek	14	74,493	34,337	1,891	1,891	1,907	38,135	53
Manganese	OG-48	Limestone Branch	1	1,658	1,058	0	0	56	1,113	36
Manganese	OG-49-A	Ed Stone Branch/Big Creek	5	1,674	1,674	0	0	88	1,762	0
Manganese	OG-49-A-1	North Branch/ Ed Stone Branch	5	936	936	0	0	49	985	0
Manganese	OG-53	Godby Branch	1	1,248	968	0	0	51	1,019	22
Manganese	OG-61	Buffalo Creek	1	12,972	3,621	0	0	191	3,812	72
Manganese	OG-65-A	Coal Branch/Island Creek	6	4,742	4,742	0	0	250	4,991	0
Manganese	OG-65-B	Copperas Mine Fork	6	121,049	121,049	24,521	24,521	7,662	153,232	0
Manganese	OG-65-B-1	Mud Fork	6	58,792	58,792	0	0	3,094	61,886	0
Manganese	OG-65-B-1-A	Lower Dempsey Branch	6	7,071	7,071	0	0	372	7,443	0
Manganese	OG-65-B-1-B	Ellis Branch/Mud Fork	6	10,550	10,550	0	0	555	11,105	0
Manganese	OG-65-B-1-E	Upper Dempsey Branch	6	2,022	2,022	0	0	106	2,128	0
Manganese	OG-65-B-4	Trace Fork/Copperas Mine Fork	6	29,229	29,229	5,818	5,818	1,845	36,892	0
Manganese	OG-75-C.5	Proctor Hollow/Buffalo Creek	8	3,140	933	1,369	1,369	121	2,424	49
Manganese	OG-76	Huff Creek	9	106,061	56,120	16,761	16,761	3,836	76,717	41
Manganese	OG-76-L	Toney Fork/Huff Creek	9	16,431	5,688	3,172	3,172	466	9,327	55
Manganese	OG-77-A.5	Oldhouse Branch/Rockhouse Creek	7	1,931	827	28	28	45	900	56
Manganese	OG-92-I	Muzzle Creek	10	35,436	6,966	0	0	367	7,333	80
Manganese	OG-92-K	Buffalo Creek/Little Huff Creek	10	11,247	6,344	68	68	337	6,749	43
Manganese	OG-92-K-1	Kezee Fork	10	3,518	771	0	0	41	812	78
Manganese	OG-92-K-2	Mudlick Fork/Buffalo Creek	10	253	253	0	0	13	266	0
Manganese	OG-92-Q	Pad Fork	10	22,826	9,472	279	279	513	10,264	58
Manganese	OG-92-Q-1	Righthand Fork/Pad Fork	10	5,054	2,938	202	202	165	3,306	40
Manganese	OG-96-A	Sturgeon Branch	7	299	280	0	0	15	294	7
Manganese	OG-96-B	Road Branch	7	11,277	4,536	1,069	1,069	295	5,899	55

Parameter	DNR Code	DNR Name	Region	Baseline LA	LA	Baseline WLA	WLA	MOS	TMDL	% Red.
Manganese	OG-96-C	Elk Trace Branch/Big Cub Creek	7	9,034	2,279	0	0	120	2,399	75
Manganese	OG-96-F	Toler Hollow	7	1,494	445	208	208	34	687	62
Manganese	OG-96-H	McDonald Fork	7	4,041	4,041	1,432	1,432	288	5,761	0
Manganese	OG-99	Reedy Branch	7	15,276	6,229	1,513	1,513	407	8,149	54
Manganese	OGC-12	Lower Road Branch	11	9,935	3,946	1,943	1,943	310	6,199	50
Manganese	OGC-16	Laurel Fork	11	210,752	91,108	11,736	11,736	5,413	108,257	54
Manganese	OGC-16-M	Milam Branch	11	15,531	7,260	0	0	382	7,642	53
Manganese	OGC-16-P	Trough Fork	11	17,774	11,449	1,967	1,967	706	14,122	32
Manganese	OGC-19	Toney Fork/Clear Fork	11	119,520	17,956	2,153	1,292	1,013	20,261	84
Manganese	OGC-26	Crane Fork	11	45,844	1,739	1,566	1,566	174	3,479	93

Table 4. Fecal coliform Baseline and Allocated Loads by Major Tributary

Drainage	DNR Code	DNR Name	Baseline LA	LA	Baseline WLA	WLA	MOS	TMDL	% Red.
Mainstem	O-4	Guyandotte River	1.28e+16	1.30e+15	2.15e+11	2.15e+11	6.87e+13	1.37e+15	90
Direct Drainage	OG-1	Russell Creek	2.92e+13	1.01e+13	1.07e+09	1.07e+09	5.32e+11	1.06e+13	65
Direct Drainage	OG-10	Merritt Creek	5.28e+13	1.05e+13	1.07e+09	1.07e+09	5.51e+11	1.10e+13	80
Direct Drainage	OG-100	Clear Fork	6.78e+14	9.68e+13	8.94e+08	8.94e+08	5.10e+12	1.02e+14	86
Direct Drainage	OG-108	Little Cub Creek	2.09e+13	1.78e+12	0.00e+00	0.00e+00	9.37e+10	1.87e+12	91
Direct Drainage	OG-11	Cavill Creek	2.35e+13	4.33e+12	8.94e+08	8.94e+08	2.28e+11	4.56e+12	82
Direct Drainage	OG-110	Indian Creek	1.63e+14	2.01e+13	0.00e+00	0.00e+00	1.06e+12	2.11e+13	88
Direct Drainage	OG-118	Turkey Creek	3.19e+13	3.41e+12	0.00e+00	0.00e+00	1.79e+11	3.59e+12	89
Direct Drainage	OG-119	Skin Fork	1.93e+13	3.92e+12	0.00e+00	0.00e+00	2.07e+11	4.13e+12	80
Direct Drainage	OG-123	Rockcastle Creek	5.48e+13	2.14e+13	0.00e+00	0.00e+00	1.13e+12	2.26e+13	61
Direct Drainage	OG-124	Pinnacle Creek	2.39e+14	3.31e+13	0.00e+00	0.00e+00	1.74e+12	3.48e+13	86
Direct Drainage	OG-127	Cabin Creek	5.60e+13	1.39e+13	0.00e+00	0.00e+00	7.33e+11	1.47e+13	75
Direct Drainage	OG-128	Joe Branch	6.73e+12	1.37e+12	0.00e+00	0.00e+00	7.20e+10	1.44e+12	80
Direct Drainage	OG-129	Long Branch	4.48e+12	7.12e+11	0.00e+00	0.00e+00	3.74e+10	7.49e+11	84
Direct Drainage	OG-130	Still Run	3.11e+13	4.99e+12	0.00e+00	0.00e+00	2.63e+11	5.25e+12	84
Direct Drainage	OG-131	Barkers Creek	1.72e+14	3.56e+13	0.00e+00	0.00e+00	1.87e+12	3.75e+13	79
Direct Drainage	OG-134	Slab Fork	2.06e+14	3.22e+13	0.00e+00	0.00e+00	1.70e+12	3.39e+13	84
Direct Drainage	OG-135	Allen Creek	4.50e+13	5.00e+12	0.00e+00	0.00e+00	2.63e+11	5.26e+12	89
Direct Drainage	OG-136	Big Branch	1.43e+13	3.07e+12	0.00e+00	0.00e+00	1.61e+11	3.23e+12	79
Direct Drainage	OG-137	Devils Fork	1.44e+14	1.93e+13	0.00e+00	0.00e+00	1.02e+12	2.03e+13	87
Direct Drainage	OG-138	Winding Gulf	6.14e+14	5.24e+13	0.00e+00	0.00e+00	2.76e+12	5.51e+13	91
Direct Drainage	OG-2	Mud River	2.64e+15	2.79e+14	1.14e+11	1.14e+11	1.47e+13	2.93e+14	89
Direct Drainage	OG-20	Twomile Creek	1.16e+13	7.67e+12	1.07e+09	1.07e+09	4.04e+11	8.07e+12	34
Direct Drainage	OG-22	Falls Creek	2.78e+13	6.86e+12	0.00e+00	0.00e+00	3.61e+11	7.22e+12	75
Direct Drainage	OG-23	Onemile Creek	2.17e+13	4.90e+12	0.00e+00	0.00e+00	2.58e+11	5.16e+12	77
Direct Drainage	OG-24	Twomile Creek	1.53e+13	3.76e+12	0.00e+00	0.00e+00	1.98e+11	3.95e+12	75
Direct Drainage	OG-27	Fourmile Creek	1.47e+14	2.20e+13	0.00e+00	0.00e+00	1.16e+12	2.32e+13	85
Direct Drainage	OG-29	Sixmile Creek	1.58e+13	2.33e+12	0.00e+00	0.00e+00	1.23e+11	2.46e+12	85
Direct Drainage	OG-3	Davis Creek	8.99e+13	1.60e+13	6.43e+09	6.43e+09	8.42e+11	1.68e+13	82
Direct Drainage	OG-31	Ninemile Creek	3.20e+13	5.19e+12	0.00e+00	0.00e+00	2.73e+11	5.47e+12	84
Direct Drainage	OG-32	Tenmile Creek	7.33e+13	8.66e+12	1.07e+09	1.07e+09	4.56e+11	9.12e+12	88

Drainage	DNR Code	DNR Name	Baseline LA	LA	Baseline WLA	WLA	MOS	TMDL	% Red.
Direct Drainage	OG-33	Furnett Creek	7.25e+12	6.49e+11	0.00e+00	0.00e+00	3.42e+10	6.83e+11	91
Direct Drainage	OG-34	Fourteenmile Creek	9.07e+13	1.05e+13	2.14e+09	2.14e+09	5.50e+11	1.10e+13	88
Direct Drainage	OG-35	Aarons Creek	7.15e+12	9.98e+11	0.00e+00	0.00e+00	5.25e+10	1.05e+12	86
Direct Drainage	OG-38	Big Ugly Creek	1.39e+14	1.22e+13	0.00e+00	0.00e+00	6.41e+11	1.28e+13	91
Direct Drainage	OG-4	Booten Creek	1.95e+13	3.04e+12	0.00e+00	0.00e+00	1.60e+11	3.20e+12	84
Direct Drainage	OG-40	Sand Creek	2.27e+13	1.01e+12	0.00e+00	0.00e+00	5.33e+10	1.07e+12	96
Direct Drainage	OG-42	Little Harts Creek	4.06e+13	2.97e+12	0.00e+00	0.00e+00	1.56e+11	3.13e+12	93
Direct Drainage	OG-44	Big Harts Creek	3.35e+14	2.01e+13	1.97e+09	1.97e+09	1.06e+12	2.12e+13	94
Direct Drainage	OG-45	Green Shoals Branch	1.39e+13	9.73e+11	0.00e+00	0.00e+00	5.12e+10	1.02e+12	93
Direct Drainage	OG-48	Limestone Branch	9.65e+12	6.54e+11	2.14e+09	2.14e+09	3.45e+10	6.91e+11	93
Direct Drainage	OG-49	Big Creek	1.98e+14	1.05e+13	0.00e+00	0.00e+00	5.51e+11	1.10e+13	95
Direct Drainage	OG-51	Crawley Creek	1.19e+14	5.85e+12	1.07e+09	1.07e+09	3.08e+11	6.16e+12	95
Direct Drainage	OG-53	Godby Branch	9.66e+12	5.77e+11	0.00e+00	0.00e+00	3.04e+10	6.08e+11	94
Direct Drainage	OG-59	Mill Creek	4.29e+13	1.97e+12	0.00e+00	0.00e+00	1.04e+11	2.07e+12	95
Direct Drainage	OG-6	Mill Creek	3.89e+13	8.41e+12	1.97e+09	1.97e+09	4.43e+11	8.85e+12	78
Direct Drainage	OG-61	Buffalo Creek	3.51e+13	1.26e+12	0.00e+00	0.00e+00	6.65e+10	1.33e+12	96
Direct Drainage	OG-65	Island Creek	2.38e+15	5.06e+13	2.90e+10	2.90e+10	2.66e+12	5.32e+13	98
Direct Drainage	OG-68	Dingess Run	1.25e+14	7.06e+12	0.00e+00	0.00e+00	3.72e+11	7.43e+12	94
Direct Drainage	OG-70	Rum Creek	6.90e+13	6.89e+12	0.00e+00	0.00e+00	3.63e+11	7.25e+12	90
Direct Drainage	OG-73	Rich Creek	6.57e+13	2.77e+12	0.00e+00	0.00e+00	1.46e+11	2.92e+12	96
Direct Drainage	OG-75	Buffalo Creek	1.65e+14	2.82e+13	0.00e+00	0.00e+00	1.49e+12	2.97e+13	83
Direct Drainage	OG-76	Huff Creek	2.98e+14	2.11e+13	0.00e+00	0.00e+00	1.11e+12	2.22e+13	93
Direct Drainage	OG-77	Rockhouse Creek	4.59e+13	1.90e+12	0.00e+00	0.00e+00	9.98e+10	2.00e+12	96
Direct Drainage	OG-78	Sandlick Creek	2.22e+13	1.03e+12	0.00e+00	0.00e+00	5.40e+10	1.08e+12	95
Direct Drainage	OG-8	Lower Tom Creek	4.62e+13	9.34e+12	0.00e+00	0.00e+00	4.92e+11	9.83e+12	80
Direct Drainage	OG-80	Elk Creek	8.78e+13	3.85e+12	0.00e+00	0.00e+00	2.03e+11	4.05e+12	96
Direct Drainage	OG-82	Spice Creek	1.80e+13	4.87e+11	0.00e+00	0.00e+00	2.57e+10	5.13e+11	97
Direct Drainage	OG-89	Gilbert Creek	2.60e+14	1.29e+13	0.00e+00	0.00e+00	6.81e+11	1.36e+13	95
Direct Drainage	OG-9	Heath Creek	5.77e+13	9.82e+12	8.94e+08	8.94e+08	5.17e+11	1.03e+13	83
Direct Drainage	OG-92	Little Huff Creek	2.36e+14	1.92e+13	0.00e+00	0.00e+00	1.01e+12	2.02e+13	92
Direct Drainage	OG-96	Big Cub Creek	1.42e+14	7.06e+12	0.00e+00	0.00e+00	3.72e+11	7.43e+12	95
Direct Drainage	OG-97	Long Branch	1.46e+13	6.20e+11	0.00e+00	0.00e+00	3.26e+10	6.53e+11	96
Direct Drainage	OG-98	Big Branch	2.15e+13	1.02e+12	0.00e+00	0.00e+00	5.37e+10	1.07e+12	95
Direct Drainage	OG-99	Reedy Branch	1.78e+13	6.38e+11	0.00e+00	0.00e+00	3.36e+10	6.72e+11	96

Table 5. Selenium Baseline and Allocated Loads by Major Tributary

DNR Code	Stream Name	TMDL (ug/L)	MOS	WLA (ug/L)	LA(ug/L)
WVOG-2	Mud River upstream of Upton Fork	5.0	Implicit	5.0	NA
WVOGM-47	Sugar Tree Branch	5.0	Implicit	5.0	NA
WVOGM-48	Stanley Fork	5.0	Implicit	5.0	NA

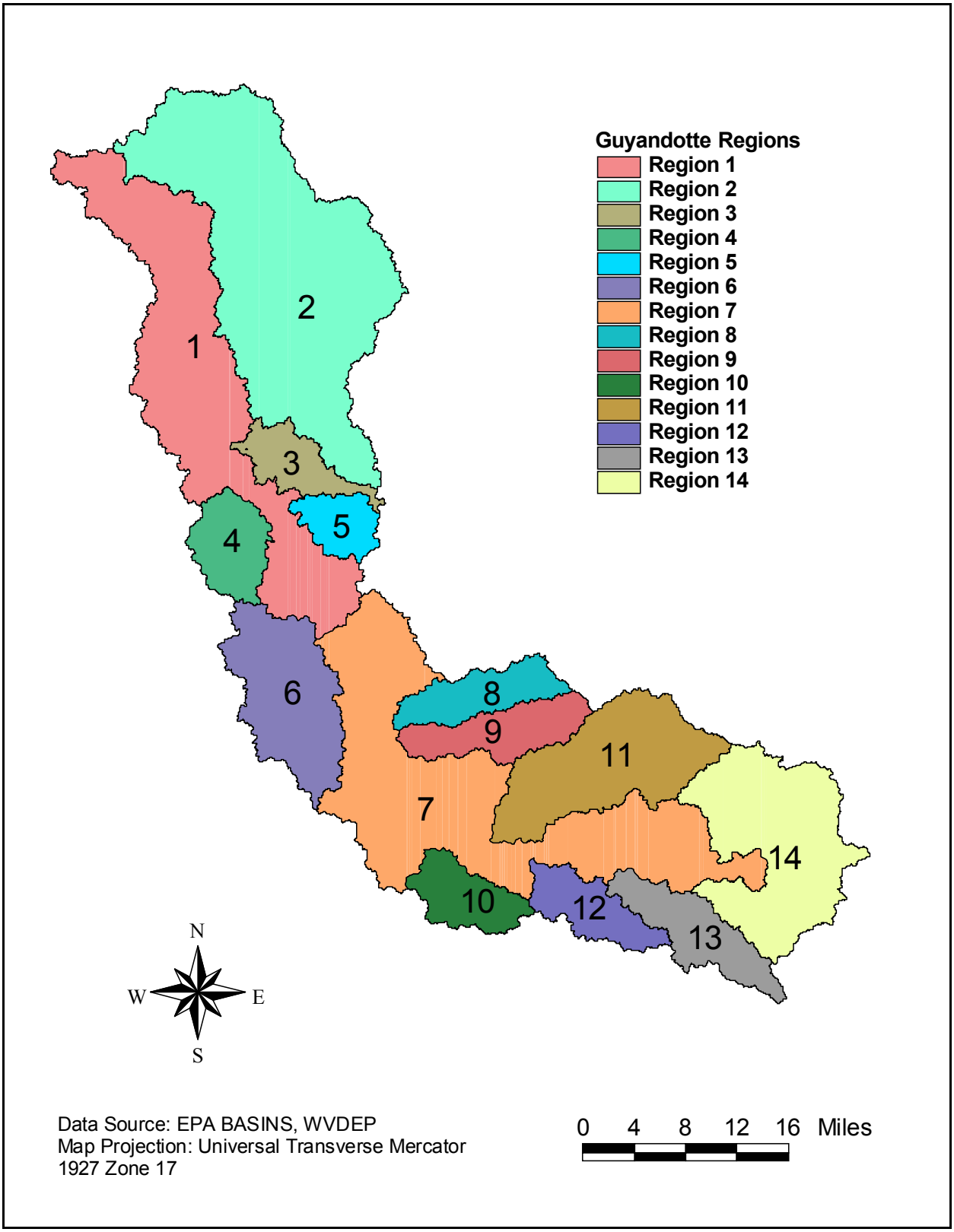

Figure 1. Guyandotte River watershed and its 14 regions